

PROCEEDINGS OF THE
INSTITUTION OF CHEMISTS
(INDIA)



VOL. 40

1968

PART III

Proceedings of the Institution of Chemists (India)

VOL. 40

1968

PART III

ANNOUNCEMENT

At the meeting of the Council held on 10th June, 1968 the following were elected Fellows, Associates and Members :

Fellows :

Shri Sudhir Kumar Ghosh, Calcutta.

Associates (Without Examination) :

Shri Dharmendra Swarup, New Delhi.	Shri Alexander Albuquerque,
Shri T. Subrahmanyam, Madras.	Mandya.
Shri V. S. Sundara Rao, Madras.	Shri A. S. Netrawali, Bombay.
Shri Rajendra Nath Sharma, Ranchi.	Shri L. S. Subba Rao, Mysore.
„ B. A. Nagle, Singhbhum.	„ S. C. Pati, Berhampur,
„ S. K. Chakrabarti, Assam.	„ K. Hari Haran, Mysore.

Associates (By Examination) :

Shri Baidya Nath Ghosh, Calcutta.	Shri Vijay Prakash Sharma, Kanpur.
Shri Mukh Raj Grover, New Delhi.	Shri Vijay Kumar Seth, Karnal.
„ Dilip Kumar Indra, Calcutta.	„ S. Venkatesan, Karaikudi.
„ Arbind Shankar, Patna.	„ M. A. Majeed, Neelore.
„ M. L. Dutta Gupta, New Delhi	„ Sushanta Kumar Bhattasali,
	Rourkela.

Members :

Shri K. Rama Rao, Guntur.	Shri K. L. Kothari, Dharwar.
Dr. Chittaranjan Prasad, Ranchi.	Shri K. Gurumurthy, Bombay.
Shri S. Nagendra Rao, Eluru.	Shri Suresh C. Sawhney, Dadri.
Miss. C. Sunandana, Hyderabad.	Miss. G. Syamala, Hyderabad.
Shri V. J. Kanai, Bombay.	Shri M. Krishan Rao, Hyderabad.
Shri Badri N. Chakravorty, Calcutta.	Shri R. S. Agarwal, Kota.
„ Madan M. Hati, Calcutta.	„ Prabhat Kumar, Patna.
„ A. Muthiah, Coimbatore.	„ R. Sundaram, Coimbatore.
„ Prafulla K. Sarkar, Calcutta.	„ V. Balakrishnan, Jabalpur.
„ Raghu Nath Chadha, New Delhi,	„ Murari M. Deb Sharma, Ranchi.

The following Registered Candidates are due to appear at the Associateship Examination to be held in November, 1968 :—

Roll No.	Names.	Regd. No.	Sections.
1	Shri M. P. Alexander, Sindri.	65662	4 and 7
2	Shri S. Kailasam, Madras.	656620	2 and 5
3	„ M. N. Ramanuja, Mysore.	656630	3 „ 5
4	„ R. L. Iyer, Singhbhum.	656632	1 „ 7
5	„ J. Sarat Chandra Rao, Madras.	656635	1 „ 4
6	„ Khem Raj Gupta, Simla.	656636	3 „ 5
7	„ Pravat Bhattacharya, Dhanbad.	656637	1 „ 7
8	„ Mohendra Nath Rai, Dhanbad.	656645	4 „ 7
9	„ Karuna Kant Mishra, Dhanbad.	656658	4 „ 7
10	„ Sunil K. Mukherjee, Dhanbad.	656666	1 „ 7
11	„ V. S. Raghavan, Sindri.	656667	4 „ 7
12	„ R. Srinivasan, Jamshedpur.	656672	1 „ 7
13	„ K. Srinivasan, Hyderabad.	656677	4 „ 5
14	„ A. R. Hari Rao, Bombay,	656695	1 „ 7
15	„ Samir K. Gupta, Calcutta.	656699	1 „ 7
16	„ S. N. Khadakkur, Calcutta.	6566100	4 „ 8
17	„ Ratan K. Mukherjee, Calcutta.	6566101	2 „ 3
18	„ Syed Mohammed, Hyderabad.	6566120	3 „ 5
19	„ Hamendra N. Saha, Bhilai.	6566128	1 „ 7
20	„ Ram K. Saugar, New Delhi.	6566147	3 „ 6
21	„ Amalesh Roy, Calcutta.	6566149	1 „ 7
22	„ M. G. Amravaneswaran, Madras.	6566156	4 „ 9
23	Sm. Kodali Suguna, Hyderabad.	6566158	3 „ 4
24	Shri Saradindu Bagchi, 24-Parganas,	6566171	4 „ 8
25	„ Prafulla K. Gupta, Midnapur.	6566175	4 „ 8
26	„ M. Aravindakshan, Baroda.	6566176	2 „ 5
27	„ Ramesh C. Gupta, Delhi.	6566179	1 „ 11
28	„ Bishnujyoti Bagchi, Shillong.	6566185	3 „ 4
29	„ Ranadev Dutta, Calcutta.	6566187	1 „ 4
30	„ G. S. Sanglikar, Poona.	6566189	2 „ 3
31	„ Krishna N. Mandal, Dhanbad.	6566191	1 „ 7
32	„ Dilip K. Majumdar, Calcutta.	6566199	2 „ 9
33	„ R. S. Lamba, Singhbhum.	6566201	1 „ 4
34	„ Asoke K. Dutta, Howrah.	66673	1 „ 7
35	„ Aditya K. Roy, Shillong.	66674	3 „ 4
36	„ Santosh K. Mukherjee, Calcutta	66676	3 „ 5
37	„ Prem Narain Sinha, New Delhi.	666716	3 „ 6
38	„ Asit K. Dutta, Calcutta.	666718	4 „ 5

Roll No.	Names.	Regd. No.	Sections.
39	„ M. A. Subrahmanian, Nagpur.	666720	1 and 4
40	„ Braja Kishore Dash, Cuttack.	666724	3 „ 4
41	„ Prem Nath Koul, Srinagar.	666740	2 „ 8
42	„ Uma Sankar Prasad, Singhbhum.	666741	1 „ 4
43	„ C. V. Sathyanarayan, Secunderabad.	666747	4 „ 9
44	Sm. B. Shanta Narayan, Hyderabad.	666749	3 „ 4
45	Shri Manjit Singh, Alwar.	666761	3 „ 6
46	„ Dilip K. Sarkar, Calcutta.	666773	1 „ 4
47	„ Satyabrata Sanyal, Dhanbad.	666783	1 „ 7
48	„ F. V. Reddy, Hyderabad.	666789	2 „ 6
49	„ S. M. Quadri, New Delhi.	666791	3 „ 5
50	„ Dilip Biswas, Dhanbad.	666793	1 „ 7
51	„ Amal K. Chakravarti, Hooghly.	666796	4 „ 8
52	„ B. A. Prasad, Kakinada.	6667110	3 „ 5
53	„ S. Kathiresan, Madras.	6667113	4 „ 8
54	„ Arya K. Bose, Calcutta.	6667115	4 „ 5
55	„ Bhupendra K. Dutta, Calcutta.	6667127	2 „ 6
56	„ Tarunesh Sarkar, Calcutta.	6667132	1 „ 8
57	„ Darshan Lal Lamba, New Delhi.	6667135	4 „ 5
58	„ V. C. Sharma, Jaipur.	6667137	4 „ 8
59	„ J. K. S. Payal, Tatanagar.	6667138	1 „ 8
60	„ Nagendra N. Saha, Kanpur.	6667140	6 „ 10
61	„ Biplab Mitra, Dhanbad.	6667143	1 „ 7
62	„ Harivansh P. Mishra, Bhagalpur.	6667144	1 „ 8
63	„ Kamala K. Maji, Calcutta.	6667151	1 „ 4
64	„ Naresh C. Varma, New Delhi.	6667154	3 „ 6
65	„ Amitava Mitra, Calcutta.	6667156	1 „ 6
66	„ Karuna S. Sharan, Singhbhum.	6667158	1 „ 4
67	„ B. S. Sudhakar, Bombay.	6667166	2 „ 6
68	„ Kamal K. Sen, Calcutta.	6667168	1 „ 8
69	„ Pranesh Rotti, Bangalore.	6667171	1 „ 6
70	„ Hem Raj Sewhney, Delhi.	6667176	1 „ 6
71	„ Sisir K. Mukherjee, Calcutta.	6667180	1 „ 8
72	„ Ranjit K. Bandyopadhyay, Calcutta.	6667184	1 „ 6
73	„ Abhimanyu Bisak, Calcutta.	6667185	3 „ 4
74	„ Sajal Mukherjee, Calcutta.	6667186	1 „ 8
75	„ W. S. Gaikwad, Nagpur.	6667187	3 „ 6
76	„ Kabindra N. De, Calcutta.	6667188	1 „ 8
77	„ Sailendra C. Chatterjee, Dhanbad.	6667189	1 „ 8
78	„ C. R. Balakrishnan, Bangalore.	6667197	2 „ 5
79	„ Banitosh Maitra, Delhi.	6667202	3 „ 6

Roll No.	Names.	Regd. No.	Sections.
80	„ Dibyendu Bhowmik, Calcutta.	6667209	4 and 6
81	„ Satish K. Cheker, Delhi.	6667218	3 „ 6
82	„ Samar K. Chaudhuri, Dhanbad.	6667224	1 „ 7
83	„ Santosh K. Gupta, Calcutta.	6667225	1 „ 7
84	„ T. S. Rajangam, Madras.	6667228	4 „ 9
85	„ K. K. Juneja, Delhi.	6667238	1 „ 11
86	„ Akhil C. Basak, Dhanbad.	6667240	1 „ 7
87	„ Ajit K. Roy, Dhanbad.	6667244	1 „ 8
88	„ V. A. Vazirani, Bombay.	67681	2 „ 6
89	„ Amal K. Das, Dhanbad.	67683	4 „ 7
90	„ K. Sundareshan, Bangalore.	67685	3 „ 5
91	„ S. K. Deshpande, Poona.	67686	4 „ 6
92	„ Surjit Lal, Meerut.	67687	3 „ 4
93	„ Lajinder Singh, New Delhi.	67689	3 „ 6
94	„ Prafulla R. Sarkar, Rourkela.	676811	4 „ 7
95	„ Swarn Singh Udehan, Chandigarh.	676813	2 „ 3
96	„ Satyabrata Basu, Dhanbad.	676814	1 „ 7
97	„ Ram Prakash Porwal, Lucknow.	676815	1 „ 4
98	„ Ram Prashad Gupta, Delhi	676817	3 „ 5
99	Sm. M. D. Telang, Bhavnagar.	676819	4 „ 8
100	Shri R. S. Agarwal, Kota.	676820	4 „ 6
101	„ A. Kesava Menon, Sibsagar.	676823	4 „ 8
102	„ R. Rajagopalan, Neyveli.	676824	4 „ 7
103	„ T. K. Paul, Sibsagar.	676827	4 „ 8
104	„ R. B. Baiswara, Nagpur.	676828	1 „ 6
105	„ K. Murali Mohan, Guntur.	676829	4 „ 6
106	„ Bibhuti B. De, Calcutta.	676831	1 „ 4
107	„ Dhanraj Sunerah, Hyderabad.	676834	3 „ 6
108	„ Raj Kumar Dhand, Naya Nangal.	676835	1 „ 4
109	„ K. C. Mehta, Ahmedabad.	676836	2 „ 5
110	„ R. Venkatasubramanian, Madras.	67683	1 „ 6
111	„ Somnath Banerjee, Dhanbad.	676839	1 „ 7
112	„ Biswanath Dalal, Dhanbad.	676841	1 „ 7
113	„ Shiv Kumar, Ghaziabad.	676844	3 „ 6
114	„ D. P. Thakore, Baroda.	676846	2 „ 5
115	„ Awtar Singh Dhani, New Delhi.	676848	4 „ 6
116	„ Parimal Kanti Guha, Ranchi.	676849	1 „ 7
117	„ K. P. Anand Prakash, Poona.	676851	1 „ 5
118	„ Ch. Chinnaiah, Rourkela.	676852	4 „ 7
119	„ Mahadeb C. Bandyopadhyay, Burdwan.	676855	1 „ 7
120	„ Krishan Samnol, Haryana.	676859	4 „ 7

(Continued on page 17)

QUESTIONS

Institution of Chemists (India)

Associateship Examination, November, 1967

Group A : Analytical Chemistry

All questions of each paper are of equal value ; equations to be given wherever possible ; for each paper-full marks—100 and time allowed 3 hours ; *any three* questions to be attempted from each part of papers I and II ; for Sectional Papers *any six* questions to be attempted unless otherwise mentioned. (Each candidate is required to appear in two Sections only as mentioned in his application).

General Chemistry : Paper I

Part I

1. What is Grignard's Reagent ? Show how you can prepare with its help hydrocarbons, primary, secondary and tertiary alcohols and acids.
2. How are **any four** of the following conversions carried out :
(a) Malonic acid into isobutyric acid ; (b) Formaldehyde into n-butanol ;
(c) Acetaldehyde into lactic acid ; (d) Benzene into o-and p-hydroxy benzaldehyde ; (e) Benzaldehyde into isoquinoline ; (f) Propylene into glycerol.
3. Discuss the chemical reactions you would use to distinguish **any four** of the following :
(a) Acetaldehyde from acetone ; (b) Ethyl amine from aniline ;
(c) Benzyl chloride from chlorobenzene ; (d) Ethyl alcohol from phenol ; (e) Sec-Butanol from tert-butanol ; (f) Benzaldehyde from salicylaldehyde.
4. What are enzymes ? Outline the steps involved in the conversion of starch into ethyl alcohol under the influence of specific enzymes. How is absolute alcohol obtained ?

Part II

5. How is hydrogen obtained on a large scale ? Discuss the manufacture of ammonia. Enumerate the compounds of nitrogen used as fertilisers.
6. What are transition elements ? Discuss their general properties and justify their position in the Periodic Table.
7. Mention the important ores of aluminium with their formulae. How are pure alumina and metallic aluminium obtained from these ? State clearly how increased production of this metal is meeting domestic and industrial requirements as a substitute for another metal in short supply in the country.

8. Write short notes on *any three* of the following : (a) Permutit ; (b) Thermit Process ; (c) Ionazite ; (d) Cupellation ; (e) Amalgam.

General Chemistry : Paper II

Part III

1. What is a colloid ? Classify the various types of colloids. Explain the terms : (a) Gold Number ; (b) Peptisation.
2. Write short notes on *any three* of the following : (a) Avogadro Number ; (b) β -Particle ; (c) Eutectic ; (d) Anion ; (e) Autocatalysis ; (f) Isotonic Solution.
3. Describe the principle underlying the control of pH for precipitations and separations of metals as their sulphides.
4. Write notes on *any three* of the following : (a) Nucleus of an atom ; (b) Group Displacement Law ; (c) Surface Tension ; (d) Hydrogen Electrode.

Part IV

5. Give an account of organic reagents used in quantitative analysis of metallic ions.
6. Explain Solubility Product. Show how it can be used to explain many of the processes in qualitative inorganic analysis.
7. Explain why : (a) KCN is used for separation of Cu and Cd ;
(b) NH_4Cl is used in separation of Group IIIA and Group IIIB metals
(c) KI is not used for gravimetric determination of silver.
8. Give an account of the fluorometric method of analysis. Give one concrete example.

Or

Give an account of *any one* of the following as an analytical tool :

- (a) Thin Layer Chromatography ;
- (b) Polarography ;
- (c) Polarimetry.

Section (1) : Analysis of Minerals, Silicates, Ores and Alloys

1. Draw a scheme for complete analysis of magnesite bricks. Discuss in detail the principles of separation of low amounts of calcium from large amounts of magnesium.
2. How would you analyse high speed tool steel. Give in detail the method for determination of tungsten in steel.
3. What are the methods available for determination of sulphur in steel ? Describe one method in detail, pointing out its advantages and disadvantages.

4. Give the methods for determination of magnesium and manganese in aluminium alloys. State clearly the theoretical principles involved.
5. What is the difference between a Chinaclay and a Fireclay ? How would you determine the P.C.E. of a sample of Chinaclay ?
6. Write short notes on *any three* of the following :
 (a) Metal Ion Indicator ; (b) Absolute Porosity ; (c) Cuferron in quantitative estimation ; (d) Fixed carbon in a sample of graphite ; (e) Dead-burning of Magnesite.
7. Describe a method for estimation on Sulphur and Phosphorus in Coal.
8. In a sample there are Copper, Zinc and Lead. What method do you suggest to estimate them ? Give reasons.

Section (2) : Analysis of Drugs and Pharmaceuticals

1. State the drug from which digoxin is isolated. In what main aspects does this drug differ from the sister species included in I. P ? How is digoxin assayed by the official method ?
2. What is the principal therapeutic use of Diiodohydroxy-quinoline ? Describe the structural formulae of other drugs used for the same purpose. State the salient points in the assay of the diiodohydroxy-quinoline by I.P. method.
3. Write short notes on *any three* of the following :
 (a) Anthelmintics ; (b) drug resistance ; (c) percolation ; (d) Rf value ; (e) oxidation-reduction potential.
4. What is meant by the term Immunity ? Describe in brief the principles and standardisation of an antitoxic serum.
5. Pick out any essential oil which you have tested for its quality and conformity with the pharmacopoeial standards and describe in detail the procedure you have adopted in carrying out its assay including the principles involved in the method followed.
6. Given a phial of Procaine Benzylpenicillin and an ampoule of Water for injection, describe how you would proceed in carrying out the sterility test for above. Explain the principles involved in the method used.
7. What do you understand by the term 'anti-histamines' ? Give the structural formulae of the following : Diphenhydramine, Naphazoline, Antazoline, and Chlorcyclizine. Explain the salient points in the assay of Chlorcyclizine Hydrochloride by the I.P. or the B.P. method.
8. What is Magnesium Trisilicate ? What for is it used ? How is it prepared ? Explain the sources of impurities in this substance, and state the tests you would carry out to determine their compliance with the pharmacopoeial standards. Outline briefly the official assay process. Why is it necessary to preserve it in a well-closed container ?

Section (3) : Analysis of Foods

1. Discuss the composition of butter fat (ghee) and state how it differs from vanaspati and cocoanut oil. How would you detect the adulteration of cocoanut oil and vanaspati in a sample of ghee?
2. Write short notes on *any four* of the following :
 - (a) alcoholic acidity of flour ;
 - (d) ash insoluble in hydrochloric acid ;
 - (c) added water in milk ;
 - (d) gluten of wheat ;
 - (e) volatile and nonvolatile ether extractive of spices ;
 - (f) estimation of protein in foodstuff.
3. How would estimate the following (attempt *any four* only) :
 - (a) lactose in milk ;
 - (b) vitamin A in vanaspati ;
 - (c) caffeine in tea ;
 - (d) vitamin B₁ in atta ;
 - (e) catechin in catechu (edible) ;
 - (f) calcium in cereal flour.
4. How would you distinguish between (attempt *any four* only) :
 - (a) arrowroot, tapioca and barley starches ;
 - (b) vegetable and coal tar colour ;
 - (c) cane sugar and lactose ;
 - (d) argemone seeds and mustard seeds ;
 - (e) synthetic and malt vinegar.
5. What is the composition of natural honey ? How would you detect commercial invert sugar syrup in honey ?
6. Describe briefly the various methods available for the determination of fruit content in fruit products like jams and marmalades.
7. Describe briefly the use of photoelectric colorimeters in the analysis of foods.
8. What are the important analyses you would carry out in black pepper ? Write short notes on the significance of each estimation.

Section (4) : Analysis of Water and Sewage

Any four questions from Part A and Any two questions from Part B to be attempted.

Part A

1. How would you estimate iron and manganese in potable water ?
2. Write short notes on *any three* of the following :
 - (a) Free and saline ammonia ;
 - (b) Conductivity of water ;
 - (c) Iron-bacteria ;
 - (d) Fluorine in water.

3. Describe the various factors which are responsible for the corrosive properties of water.
4. Describe the methods of collection of samples of water for chemical and bacteriological tests. Sketch out the method for presumptive Coli test in a sample of water.
5. What is meant by "carbonate" and "bicarbonate" alkalinity of water? How do you estimate them?
Discuss the relation between alkalinity and hardness of a sample of water,

Part B

6. What is meant by "Biological Oxygen Demand" of an effluent? Indicate the method adopted to find this.
7. Write short notes on *any three* of the following :
 - (a) strength of sewage effluents ;
 - (b) relative stability test ;
 - (c) chlorination of effluents ;
 - (d) Biological Index of Pollution (BIP).
8. How do you estimate : (a) nitrogen in nitrites and nitrates present in sewage, and (b) albuminoid ammonia of an effluent ?

Section (5) : Biochemical Analysis

1. Describe briefly the method of performing the glucose tolerance test in man. What is the significance of the results of such a test ?
2. What is the significance of optimum temperature and pH of an enzyme ? Describe an experiment to show how you would determine the optimum pH of an enzyme.
3. How would you estimate total phosphorus present in a sample of urine ? Discuss the principle and limitations of the method.
4. Write short notes on *any two* of the following :
 - (a) Calcium in blood ;
 - (b) Paper chromatography for amino acid estimation ;
 - (c) Albumin in urine ;
 - (d) Peptic and tryptic digestion.
5. What is haemoglobin and what are its functions ? How will you estimate haemoglobin in blood ?
6. What are the functions of amino acids ? Describe a method for estimation of amino acid nitrogen.
7. State under what conditions acetone bodies are found in urine. What are acetone bodies and how are they estimated ?
8. What is thiamine and where does it occur ? Describe a simple method for its estimation in urine.

Section (6) : Analysis of Oils, Fats and Soaps

1. Name the principal fatty acid present and its percentage in the following oils : (i) castor oil, (ii) cocoanut oil, (iii) tung oil, (iv) mustard oil and (v) palm oil.
What are the causes giving rise to the rancidity in oils and fats. Describe a method for its detection. Name two antioxidants which may be used to prevent rancidity in oils and fats
2. (a) Describe the autoclave method for splitting oils and fats. Give a flow diagram.
(b) Describe a method for separation of solid acids from liquid acids.
3. Describe a method for preparing boiled oil and blown oil from linseed oil. Name the 'driers' conventionally used in paints and varnishes.
4. (a) Give the source, production, main constituents and uses of Indian turpentine oil, lemon grass oil and eucalyptus oil.
(b) Write short notes on the following : (i) natural and artificial musk, (ii) blending of perfumes.
5. Give a brief summary of the chromatographic methods generally used in the analysis or identification of the different constituents of an 'essential oil'. Is any of these methods available for use in the case of "fixed" oils also ?
6. Describe briefly how you would proceed to find out if a consignment of 'washing soap bars' is within the limits of the stipulated specification regarding : (i) moisture, (ii) total fatty anhydrides, (iii) free and carbonated alkalis, (iv) chlorides and (v) total unsaponifiables and unsaponified fat
7. (a) How is glycerine classified under the terms : (i) "Chemically Pure" grade, (ii) "Dynamit" grade ?
(b) Describe the 'Acetin' method for estimation of glycerine in a sample of 'crude glycerine'.
8. What tests would you carry out to detect and approximately estimate the presence of : (i) hydrogenated oil in genuine ghee, (ii) fish oil in linseed oil, (iii) cottonseed oil in sesame oil ?

Section (7) : Fuel and Gas Analysis

1. Give an account of the industrial gaseous fuels which can be produced from coal and discuss the reasons for their difference in composition.
2. Describe a suitable method of determining the calorific value of a gaseous fuel. How will you calculate the net calorific value from the gross value. Give the composition of a coke oven gas with their gross and net calorific value.
3. Write a critical account of errors in measurement of temperature of gases and method adopted for accurate temperature measurement.

4. A gaseous fuel of the following composition by volume burns with 20% excess air :

CO ₂ -5.0%	CO-39.0%	CH ₄ -0.3%
O ₂ -0.1%	H ₂ -52.6%	N ₂ -3.0%

Flue gases leave the heater at 750°F and 14.7 lb/sq. in. Determine the composition of the flue gases and volume of flue gases formed per cu.ft. of dry fuel gas supplied at 80°F and 14.7 lb./sq. in.

5. What do you understand by ultimate analysis of coal? Describe briefly the procedure for proximate analysis of coal. Explain the purpose for which these analyses are carried out.
6. Describe the standard procedures for estimation of (a) moisture, (b) sediment, (c) carbon residue and (d) ash content of a sample of fuel oil. Indicate the importance of carrying out these tests.
7. Describe the distillation test for estimating the various fractions of motor spirit. What is understood by octane number?
8. Write notes on *any two* of the following :
- Classification of coal
 - Reactivity of coke ;
 - Blending of coal ;
 - Ash fusion point.

Section (8) : Analysis of Soils and Fertilisers

- How would you determine the lime requirement of soils? Name some indigenous materials suitable for liming.
- How are the following materials prepared :
 - Farm yard manure ;
 - Urban compost ;
 - Rural compost ;
 What are the approximate percentages of nitrogen in these materials ?
- Describe the method, one each, for the determination of the following constituents in soil : (i) nitrate nitrogen ; (ii) nitrite nitrogen.
- Describe briefly the methods of manufacture of the following fertilisers :
 - Triple superphosphate ;
 - Urea.
- Describe briefly the functions of algae in soils. What beneficial effects they have on plant growth?
- Write short notes on *any three* of the following :
 - True density of soil ;
 - Sticky point moisture ;
 - Exchangeable calcium ;
 - Clay fractions of soil.

- 7 Under what conditions organic matter accumulates in soils ? What are the main products resulting from the decomposition of soil organic matter ?
8. What are Compound Fertilisers ? How would you determine "Free Acid" and "Total Nitrogen" in Sulphate of Ammonia ?

Section (9) : Analysis connected with Forensic Chemistry

1. What are the signs and symptoms of methyl alcohol poisoning ? How will you estimate methyl alcohol in the viscera of a victim of methyl alcohol poisoning ?
2. Explain the term 'spontaneous combustion'. How will you investigate a case of arson ?
3. Write an essay on the forensic applications of chromatography with special reference to the examination of ink specimens.
- 4 What is forensic ballistics ? Explain how forensic ballistics can help in the investigation of shooting cases.
5. What are abortifacients ? Name some poisons commonly used in India for criminal abortion.

The uterine contents of a deceased woman were shown to contain a piece of vegetable twig suspected to be that of *Plumbago rosea*. Describe in detail the method of isolation and identification of the poisonous principle of the twig.

6. State the uses and importance of the following in the examination of questioned documents :
 - (a) Ultra Violet light ;
 - (b) Infra Red rays ;
 - (c) Oblique lighting ;
 - (d) Stereoscopic Microscope ;
7. The clothing of a victim is suspected to contain stains of urine and faeces. Describe the tests which may be helpful in the identification of the stains.
8. Write short notes on :
 - (a) Ingredients of common explosives ;
 - (b) Invisible inks ;
 - (c) Cuticular scale pattern of hair.

Section (11) : Analysis connected with Textile Chemistry

1. How would you estimate :
 - (a) Efficiency of a water-repelling agent ;
 - (b) Wash fastness of a dyed fabric ;
 - (c) Efficiency of a surface-active agent.

2. Discuss the methods used for determining the chain lengths of fibre molecules.
3. Explain the function of the following :
 - (a) Reactive groups of fibres on their hygroscopicity ;
 - (b) Silicate in peroxide bleaching ;
 - (c) Synthetic resins in textile finishing.
4. Write an essay on the most economic and effective ways in improving the following properties of bleached cellulosic fabric during dyeing with Direct Cotton Colours and subsequent finishing operations : (a) light fastness, (b) wash fastness, (c) rubbing fastness.
5. Write the chemistry of *any four* of the following :
 - (i) Nylon 6, 6 ; (ii) Ardil ; (iii) Terylene ; (iv) Orlan ; (v) Acetate Rayon.
6. What is the difference between temporary hardness and permanent hardness of water ? Discuss the basic principles of any two important methods of water softening for textile purposes.
7. (a) What is a detergent ? How would you classify them ? Illustrate each class with one suitable example.
 (b) Briefly outline the method of preparation of Turkey-red oil.
8. Write short notes on *any four* of the following :
 - (i) optical bleaching ; (ii) methylene blue absorption value ; (iii) crease-resistant finishes ; (iv) fire-proofing ; (v) water-proofing.

PRACTICAL

In each Section Full Marks-300 including *Viva-voce*--60 and time allowed-2 days of six hours each.

Section (1) : Analysis of Minerals, Silicates, Ores and Alloys.

1. Determine the amount of iron as Fe in the entire given sample.
2. Determine the amount of copper as Cu in the entire given sample.
3. Determine the amount of Calcium as Cau in the entire given sample.
4. Determine the amount of mercury as Hg in the entire given sample.

Section (2) : Analysis of Drugs and Pharmaceuticals.

1. (a) Identify the powder by microscopic examination (Sample A).
 (b) Determine the refractive index of the sample (B).
2. Analyse sample (C) of glacial acetic acid. Say, whether it is Pharmacopoeial or not.
3. Determine the dextrose content in the sample (D) according to I.P.
4. Make a report on the sample (E) of milk of Magnesia according to I.P.

5. Give a full report on the sample (F) of Phenobarbitone sodium Injection.
6. Identify the bacteria in the sample (G).

Section (3) : Analysis of Foods.

1. Report upon the sample of Milk.
2. Determine the saponification value/iodine value/acid value and Butyrefractometer reading of the sample of Oil/Fat.
3. Determine the total sugars and sucrose of Jaggery.
4. Examine the added colour in the sample of the beverage.

Section (4) : Analysis of Water and Sewage.

1. Examine physically the sample of Water and determine Chloride Alkalinity, Total Hardness, Permanent Hardness and Iron.
 2. Give your opinion on the suitability of the above Water for potable and industrial purpose on the basis of the results obtained.
 3. Determine the 24 Hours' B. O. D. at room temperature in the sample of Sewage Effluent.
 4. Estimate the Available Chlorine in the solution of Bleaching Powder.
- N. B. Note the Number of each of the samples analysed.

Section (5) : Biochemical Analysis.

(Express the results in micrograms)

1. Estimate the Total Iron content in the given sample 'F'.
2. Estimate the Glucose content in the given sample 'G'.
3. Estimate the Niacin content in the given sample 'V'.

Section (6) : Analysis of Oils, Fats and Soaps.

1. Determine the percentage of mineral oil present in sample of Coconut oil marked A.
2. In what group-Drying, semidrying and nondrying-would you place sample of oil marked B, justifying your placing the same.
3. Determine free alkali in the sample of soap marked C quantitatively.
4. Determine the Refractive Index of the sample of oil marked D at room temperature and express the result at 40°C.
5. Three bottles of different oils are placed before you. Identify the oil as marked on the spot, within time limit of 5 minutes.
6. Determine the Reichert-Meissl and Polenskey values of the sample of fat marked E.
7. Detect the presence of, with your conclusive remark
 - (i) Linseed oil in the sample of oil marked F
 - (ii) Sesame oil in the sample of oil marked G
 - (iii) Cotton seed oil in the sample of oil marked H

Section (7) : Fuel and Gas Analysis.

1. Determine the coefficient of Viscosity of the liquid supplied with the help of Falling Sphere Viscometer. (one day).
2. Determine the viscosity of the given sample of liquid with the help of Redwood Viscometer at.....(one day).
3. Determine the percentages of CO , CO_2 and O_2 in the given sample of fuel gas with the help of Orsat apparatus. (one day).
4. Find out the viscosity of the given sample of liquid with Ostwald Viscometer at...(one day).
5. Make a proximate analysis of the given sample of coal. (one day).

N.B. Question No. 5 was compulsory.

Section (8) : Analysis of Soils and Fertilisers.

1. (i) Determine the b.e.c. of the given H-clay suspension by titrating with KOH in half-saturated KCL.
(ii) Determine the iron content of the given soil extract.
2. Determine the contents of (i) Calcium and (ii) Nitrate in the given sample of crude fertilizer.
3. (i) Find out the apparent density, specific gravity and pore space of the given soil sample by keen Box Experiment.
(ii) Determine the calcium content of the given lime sample.
4. Determine the contents of (i) nitrate and (ii) ammonical nitrogen in the given sample of soil.
5. Determine (i) the total exchangeable bases and (ii) exchangeable calcium content of the given sample of soil.
6. Determine (i) total P content of the given extract and (ii) the available P content of the given soil sample.
7. Determine (i) the iron content in the given extract and (ii) organic matter contents of the given soil.
8. Determine the (i) chloride and (ii) bi-carbonate contents of the given aqueous extract of the soil.
9. Determine b.e.c. of the given sample of soil (i).
(ii) Determine the organic matter content of the L sample. L same

Section (9) : Analysis Connected with Forensic Chemistry.

1. (a) Identify two of the toxic constituents of the mixture marked as 'P'.
(b) Estimate the total alkaloid (morphine) content of the mixture marked as 'S'.
2. (a) Identify with confirmatory tests the biological stains on the piece of cloth marked as 'Q'.
(b) Identify with confirmatory tests the stains on the piece of cloth marked 'R'.

INFORMATION

This Institution is registered under the Registration of Societies Act XXI of 1860 (Regd. No. 6059/107 of 1928-1929).

FELLOWSHIP (F.I.C.)—Suitable for a chemist, not below 8 years, who in the opinion of the Council has done original research work of a high order, or has been engaged in important analytical, production, consulting or similar work of a general or specialised character. The nature and responsibility of the positions held by him will be taken into consideration along with any thesis or report on technological subjects submitted by him.

ASSOCIATESHIP (A.I.C.) *without examination*—Suitable for a chemist, not below 23 years, engaged in the *practice* of chemistry for at least five years in a manner satisfactory to the Council.

ASSOCIATESHIP (A. I. C.) *by examination*—A. I. C. diploma in Group A (Analytical Chemistry) obtained by examination is recognised by the Union Government as equivalent to M.Sc. degree in Chemistry for purposes of recruitment of chemists and is recognised in the Indian Drugs Act. Further details may be obtained from the office of the Institution.

MEMBERSHIP—Suitable for a graduate, with chemistry as one of the subjects, not below 21 years.

Application to any of these categories should be submitted in the prescribed form for that category. The Admission fee and Annual subscription for Fellowship are Rs. 20/- and Rs. 24/-, for Associateship Rs. 12/- and Rs. 16/- and for Membership Rs. 8/- and Rs. 1 /- respectively. No Admission fee is payable for a change in the category of the corporate membership. Six issues of the Journal of the Institution of Chemists (India) and the four issues of the Proceedings of the Institution of Chemists (India) are available to all corporate members without extra charge.

Firms, institutes or individuals, not otherwise eligible for above membership may subscribe to the Journal of the Institution of Chemists (India), inland rate (annual)—Rs. 30/- (single issue—Rs. 6/-) ; foreign rate (annual)—\$ 6 00 (U.S.A.) or 50 Shillings or Rs. 45/- (single issue—\$ 1'00 or 9 shillings or Rs. 8-). The annual Subscription for the Proceedings of the Institution of Chemists (India) is Rs. 10/- (single copy Rs. 3/-).

In order to avoid misdelivery of mails all members and subscribers are particularly requested to intimate the office of the Institution about any change of address at the earliest.

All communications should be addressed to the Hony. Secretary, Institution of Chemists (India), Chemical Department, Medical College, Calcutta-12

(Continued from page 4)

Roll No.	Names.	Regd. No	Sections.
121	„ Mukul R. Saha, Dhanbad.	676862	1 and 7
122	„ Priya Bandhu Chowdhury, Dhanbad.	676863	1 „ 7
123	„ C. K. C. Mahapatra, Cuttack.	676866	2 „ 3
124	„ E. Vikraman, Jamshedpur.	676867	1 „ 7
125	„ J. M. Kolhatkar, Baroda.	676868	3 „ 4
126	„ Sridhar Bandyopadhyay, Calcutta.	676869	1 „ 7
127	„ Nirmal K. Chakravarti, Calcutta.	676871	1 „ 7
128	„ Jagadish C. Ghosh, Calcutta.	676872	2 „ 5
129	„ H. N. Saxena, Baroda.	676878	4 „ 6
130	„ V. Gopalakrishna, Madras.	676880	4 „ 5
131	Sm. T. R. Kamala, Madras.	676883	4 „ 9
132	Shri Bansi Lal Gulati, Solhapur.	676890	1 „ 6
133	„ Bhagirath Mandal, Calcutta.	676892	4 „ 5
134	Sm. Veena Sekhri, Poona.	676897	1 „ 6
135	Sm. M. I. Yogi, Poona.	676898	1 „ 6
136	MD. S. Husain Molla, Calcutta	6768100	4 „ 5
137	Shri K. Gurumurty, Bombay.	6768101	3 „ 5
138	„ Radha Charan Dixit, Delhi.	6768105	1 „ 4
139	„ A. P. Muley, Nagpur.	6768106	1 „ 4
140	„ M. K. Achuthan Kutty, Calcutta.	6768108	4 „ 8
141	„ Rabindra N. Ray, Calcutta.	6768109	1 „ 8
142	„ N. K. Verma, Ranchi.	6768110	1 „ 7
143	„ Bachoo Prasad, Patna.	6768111	3 „ 6
144	„ Satrughna Jha, Sibsagar.	6768112	4 „ 8
145	„ Dinesh C. Mitra, Dhanbad.	6768113	1 „ 7
146	„ Siba Prasad Ghosh, Dhanbad.	6768114	1 „ 7
147	„ C. V. Dave, Anand.	6768116	3 „ 6
148	„ Man Mohan K. Kwatra, Delhi,	6768117	3 „ 6
149	„ T. E. Natarajan, Madras.	6768118	8 „ 10
150	Sm. Zakia Farida, Hyderabad.	6768121	3 „ 6
151	Shri Arunkanti Chaudhury, Dhanbad.	6768123	1 „ 7
152	„ R. S. Mangalvedi, Bhagalpur.	6768124	2 „ 6
153	„ Ashim K. Chakraborty, Ranchi.	6768129	1 „ 7
154	„ Raj Kishore Pd. Singh, Ranchi.	6768130	1 „ 7
155	„ Y. S. Kaushikkar, Nagpur,	6768132	1 „ 7
156	„ Sambhu N. Saha, Calcutta.	6768137	1 „ 8
157	„ Bijoy K. Maiti, Calcutta.	6768146	3 „ 4
158	„ R. T. Kannappan, Visakhapatnam.	6768164	1 „ 8
159	„ Sunil K. Roy, Dhanbad.	6768165	1 „ 7
160	„ Hemendra Majumdar, Calcutta.	6768167	1 „ 4
161	„ Bidi Raghavendra Rao, Bangalore.	6768171	3 „ 4

Roll No.	Names.	Regd. No.	Sections.
162	„ Vishnu K. Gupta, Jaipur.	6768172	1 and 4
163	„ Kapil Deo Prasad, Bhagalpur.	6768173	4 „ 8
164	„ S. Vibhakar, Mysore.	6768174	3 „ 5
165	„ V. C. Patel, Kaira.	6768177	3 „ 4
166	„ Jamna Dass Seth, Virbhadrā,	6768178	2 „ 6
167	„ Ramesh C. Shrivastava, Rishikesh.	6768180	2 „ 6
168	„ V. N. Kalyanakrishna, Bangalore.	6768181	2 „ 3
169	„ C. S. Raghavendra Rao, Nilgiris.	6768182	4 „ 9
170	„ M. Lakshman Rao, Vijayawada.	6768183	1 „ 4
171	„ K. N. Sinha, Rourkela.	6768187	4 „ 7
172	„ Pundaleeka Rao, Mysore.	6768188	2 „ 6
173	„ Arun P. Kundu, Dhanbad.	6768190	1 „ 7
174	„ Prasanta K. Majumdar, Dhanbad,	6768192	1 „ 7
175	„ Avtar Singh Shinh, Chandigarh.	6768193	5 „ 9
176	„ S. Rajaiah, Hyderabad.	6768195	2 „ 7
177	„ Ashit K. Paul, Ranchi.	6768196	1 „ 7
178	„ Salil K. Chakraborty, Ranchi.	6768197	1 „ 7
179	„ Amiya K. Dhar, Sindri.	6768199	4 „ 7
180	„ Bijan Bihari Pal, Dhanbad.	6768203	4 „ 7
181	„ N. S. Venkataramani, Neyveli.	6768204	1 „ 7
182	„ D. S. Chandrasekharan, Madras	6768205	3 „ 6
183	„ Madan M. Malhotra, New Delhi.	6768207	1 „ 6
184	„ Y. D. Desai, Rishikesh.	6768212	2 „ 6
185	„ Amal K. Bhowmic, Calcutta.	6768217	1 „ 4
186	„ Madan M. Hati, Calcutta.	6768219	3 „ 4
187	„ Satya Ranjan Saha, Jamshedpur.	6768222	1 „ 7
188	„ Sanat K. Paul, Howrah.	6768223	1 „ 6
189	„ Akhil Ratan Ghosh, Calcutta,	6768224	2 „ 6
190	„ Aswini K. Dandapat, Durgapur.	6768225	1 „ 7
191	„ Surinder Pal Puri, Rourkela.	6768230	4 „ 5
192	„ K. Krishna Iyer, Bangalore.	6768235	1 „ 8
193	„ Gurcharan Singh Chhatwal, Patiala.	6768236	6 „ 9
194	„ Suresh C. Sawhney, Haryana.	6768238	1 „ 7
195	„ Dharendra N. Dawn, Dhanbad.	6768240	4 „ 7
196	„ Mohindu N. Sharma, Rourkela.	6768244	1 „ 7
197	„ Ram Prakash Sharma, Madras.	6768249	4 „ 6
198	„ Suresh N. Mathur, Hyderabad.	6768251	4 „ 6
199	„ S. Chandrasekharan, Madras.	6768257	3 „ 6
200	„ Satya Narayan Jha, Bhagalpur.	6768258	3 „ 8
201	„ Sudhanshu R. Ghosh Cuttack.	6768260	4 „ 8
202	„ Tapan K. Gupta, Rourkela.	6768261	4 „ 7

Roll. No.	Names.	Regd. No.	Sections.
203	„ Wakeel Ahmed, Singhbhum.	6768262	1 and 4
204	„ S. Venkatesan, Rourkela.	6768267	4 „ 7
205	„ Bani Prasad Das, Dhanbad.	6768268	1 „ 7
206	„ Arun Kanti Talukdar, Modinagar.	6768269	1 „ 7
207	„ Nisith Sen, Calcutta:	6768270	1 „ 4
208	„ Ram Asre, Sibsagar.	6768272	4 „ 8
209	„ K. S. Mædhavan, Tatanagar.	6768273	1 „ 7
210	„ Satyabrata C hosh, Dhanbad.	6768274	1 „ 7
211	„ M. N. Patil, Madras.	6768275	3 „ 6
212	„ K. R. Sundaralingam, Dhanbad.	6768276	4 „ 7
213	„ Sushil K. Dutta, Howrah.	6768281	1 „ 6
214	„ Rabindia Narayan Guha, Burdwan.	6768282	1 „ 7
215	„ N. Viswanathan, Bombay.	6768285	4 „ 7

INSTITUTION OF CHEMISTS (INDIA)

NOTICE

Chemical Department,
Medical College, Calcutta-12.

The 16th July, 1968.

All Corporate Members (Fellows, Associates and Members) are hereby requested to propose names of Corporate Members, who have expressed their willingness preferably in writing, for the Council of the Institution of Chemists (India) for the three-year period 1969-71 (under Rule 12A). Each proposal should be for one person only. Names of Dr. B. Prasad, Patna and Dr. G. M. Nabar, Bombay, who are members of the present Council and who are due to retire *by the end of this year* under Rule 12 (i) and are not eligible for re-election for the next year should not be proposed. The number of vacancies in different zones are as follows :

West Bengal and Assam-12 ; Bihar and Orissa-3 ;

U. P., M. P. and Rajasthan-2 ; Western India (Maharashtra, Gujrat)-4 ;

Southern India (Madras, Andhra Pradesh, Mysore and Kerala)-2 ;

Delhi.....1 ;

Northern India (Himachal Pradesh, Haryana, Punjab, Kashmir including Delhi)-1.

The proposals should reach the office of the Institution not later than the 12th August 1968.

R. N. Chakravarti
Honorary Secretary.

INDIAN PHARMACEUTICAL CONGRESS ASSOCIATION

The 20th Conference of the Indian Pharmaceutical Congress will be held at Ahmedabad (Gujarat) during December 24 to 26, 1968, under the presidentship of Mr. R. B. Amin, Managing Director of Alembic. There will be the following sections ; (a) Industrial Pharmacy & Microbiology ; (b) Professional & Forensic Pharmacy ; (c) Pharmacognosy & Phytochemistry ; (d) Pharmacology ; (e) Pharmaceutical (Medicinal & Analytical) Chemistry ; (f) Ayurvedic & Unani Pharmacy ; (g) Hospital Pharmacy ; (h) Educational Pharmacy.

For further informations may be available from Mr. H. C. Shah, Managing Director, Gujarat Pharmaceutical & Chemical Works, Near Chamunda Mata, Asarwa, Ahmedabad-16 ; or the Hony. Secretary, Indian Pharmaceutical Congress Association, 18, Convent Road, Calcutta-14

Printed by Shri S. N. Mitra at Kayori Press, 27, Mohendra Goswami Lane, Calcutta-6 and also Published by him from the Office of the Institution of Chemists (India), Chemical Department, Medical College, Calcutta-12.

